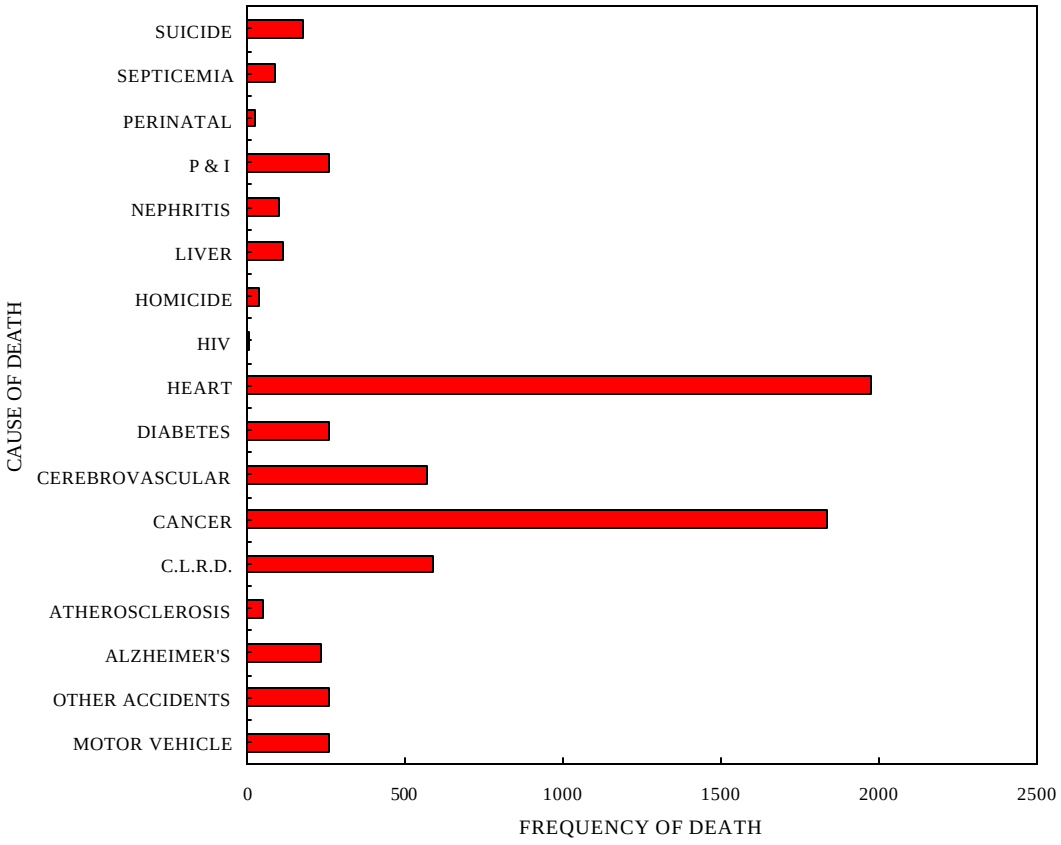
YEARS OF POTENTIAL LIFE LOST

The more traditional approach to cause of death analysis relies on frequency of death. This perspective emphasizes causes of death that affect the elderly, simply because of the larger number of such deaths. Years of potential life lost (YPLL) is an alternative measure that highlights premature, preventable, and unnecessary mortality. There are a number of different calculations for YPLL, each with a slightly different emphasis. Here we use the "premature years of potential life lost" calculation, which is easily understood and is used by the Center for Disease Control and Prevention (CDC). For each decedent younger than 75, the age at death is subtracted from 75. The results are summed by cause of death. This measure is referred to here as YPLL-75.

Frequencies and crude population-based rates for the ten leading causes of death for Montana residents are reported in **Table S-7**. The ten leading causes are: heart disease (23.4% of all resident deaths), cancer (21.8%), chronic lower respiratory diseases (CLRD) (7.0%), cerebrovascular disease (6.8%), accidents (6.1%), diabetes (3.1%), pneumonia and influenza (3.0%), Alzheimer's disease (2.8%),suicide (2.1%), and chronic liver disease and cirrhosis (1.3%). **Figure 51** represents the traditional view of cause of death analysis, showing the frequency, or number of deaths, in each cause of death category. Montanans of all ages who died of one of the listed causes in 2003 are reflected in this figure.

Figure 50

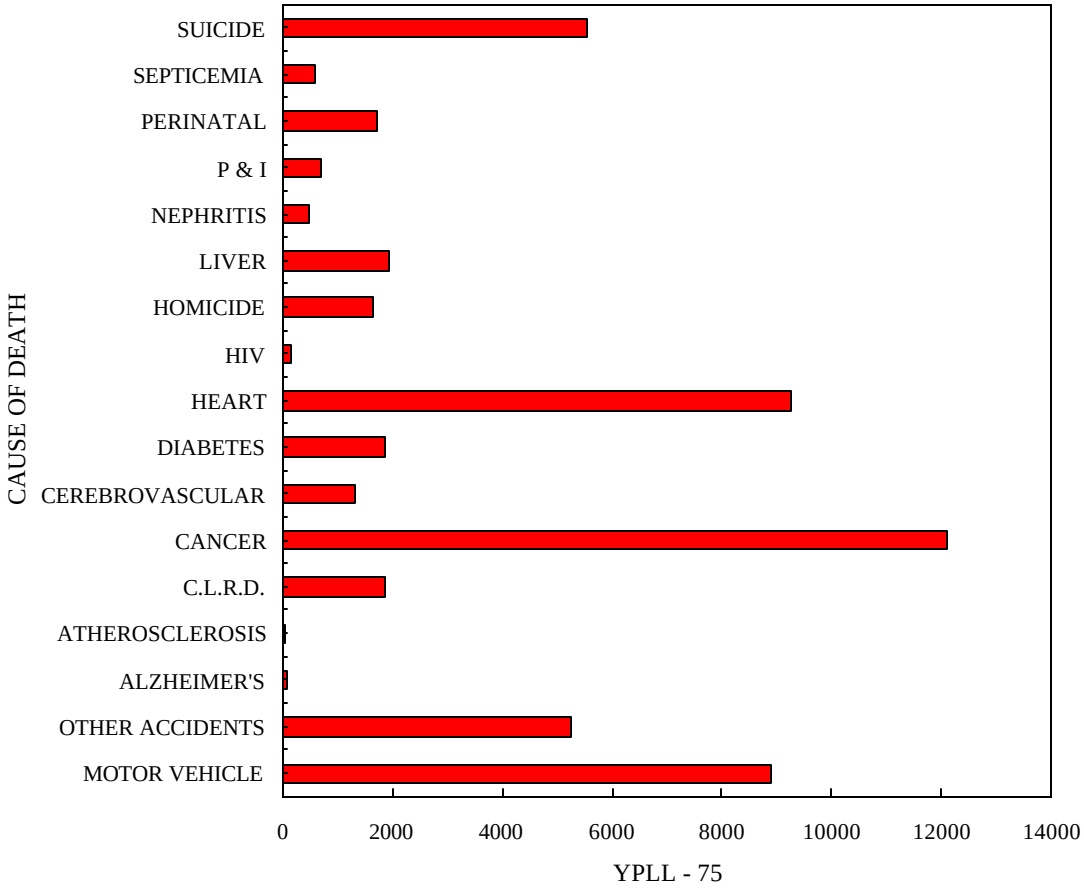
FREQUENCY OF DEATH BY CAUSE OF DEATH
MONTANA RESIDENTS, 2003



An alternative perspective, YPLL-75, is shown in **Figure 52**. Only decedents younger than 75 at the time of death are reflected in this figure Accidents (both motor and non-motor-vehicle), homicide, and suicide comprise only 8.6% of the deaths in 2003 but accounted for 31.8% of the total losses as measured by YPLL-75. This disparity in proportions, with less than a tenth of the deaths accounting for nearly a third of all years lost, points to the exaggerated cost of the typical death from traumatic causes.

Figure 51

TOTAL YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
MONTANA RESIDENTS, 2003

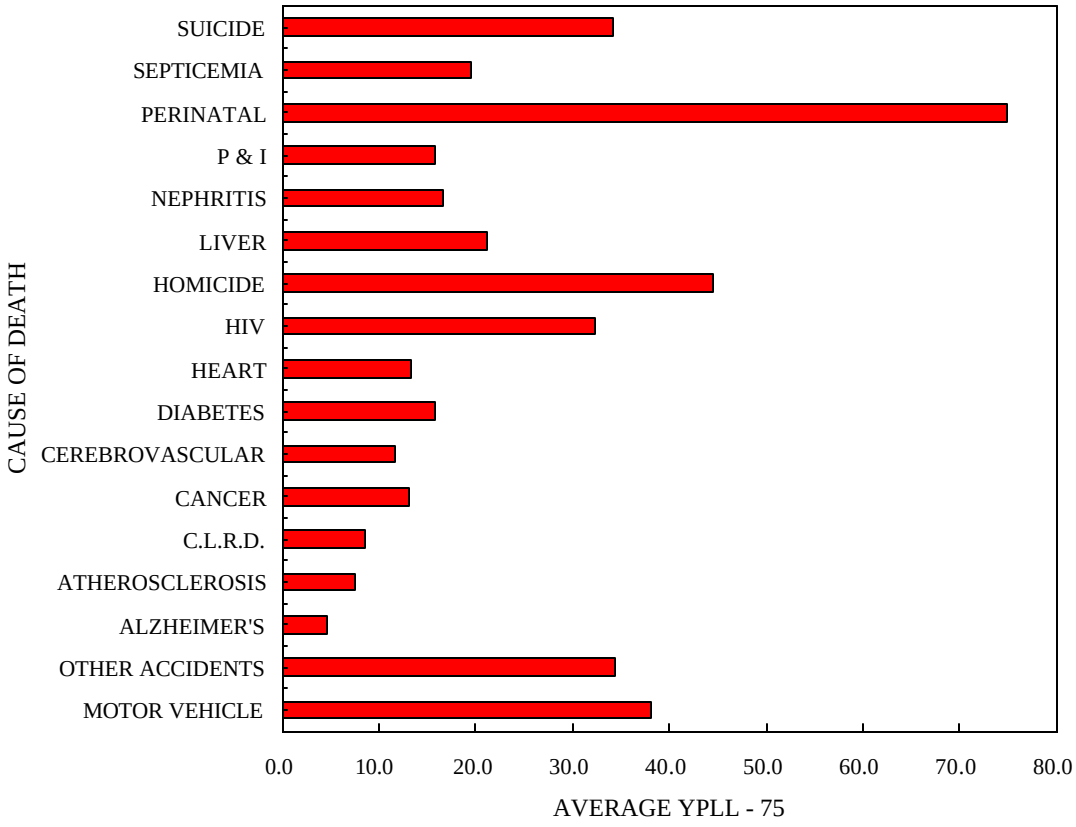


In 2003, the total loss of life before age 75 was 66,991 years. The loss to society resulting from cancer was 18.% of all years lost. Accidental deaths of any type accounted for 21% of total YPLL, with motor vehicle accidents accounting for 13.3% and non-motor-vehicle accidents accounting for 7.8%. Heart disease also caused large losses to society, accounting for 9,258years lost (13.8%). Other deaths from traumatic injury, suicide and homicide, accounted for 8.3% and 2.5%, respectively. All traumatic deaths together (accidents, homicide, and suicide) accounted for 31.8% of all YPLL-75.

Regardless of which of these two perspectives is used, cancer and heart disease cause a large social loss because of the numbers of deaths they cause, both among decedents of all ages and those less than 75 years of age (in both cases there are over 50% over 75 years of age at death; mean ages were 72.3 and 77.2, respectively). The YPLL-75 perspective does reorder the ranking of the leading causes of death, highlighting areas the CDC has said "provide the greatest potential for health improvement." Frequency of motor vehicle accidental deaths was ranked 8th and non-motor-vehicle deaths was ranked 9th but are ranked 3rd and 5th in terms of YPLL-75, indicating that accidental deaths are prevalent in those less than 75 years of age and cause great losses to society due to premature death (there were only 16% of the motor vehicle deaths over the age of 75). Suicide ranked tenth by frequency, but became the fourth leading cause when measured by total YPLL-75 (and there were only 11% of the suicides over 75 years of age).

Figure 52

AVERAGE YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
MONTANA RESIDENTS, 2003



Average YPLL-75 is calculated by dividing the total YPLL-75 for each cause of death by the number of decedents less than 75 years of age. While total YPLL-75 emphasizes the loss to society in terms of years of lost life, average YPLL-75 emphasizes the loss to the individual. This measure is shown in **Figure 53**.

Figure 53

AGE AT DEATH AND YEARS OF POTENTIAL LIFE LOST BEFORE AGE 75
BY CAUSE OF DEATH
CENTRAL TENDENCY AND DISPERSION*
MONTANA RESIDENTS, 2003

CAUSE OF DEATH	AVERAGE YPLL - 75	NUMBER OF DECEDENTS YOUNGER THAN 75	TOTAL YPLL – 75	MINIMUM AGE	MEAN AGE	MEDIAN AGE	MODAL AGE	MAXIMUM AGE	STANDARD DEVIATION	NUMBER OF DECEDENTS OF ALL AGES
ALL CAUSES	19.1	3509	66,994	0	73.1	78	85	107	18.9	8445
CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD	74.8	23	1,720	0	0.2	0	0	5	1.0	23
ASSAULT (HOMICIDE)	44.4	37	1,644	1	30.6	28	26	58	16.0	37
MOTOR VEHICLE ACCIDENTS	38.1	234	8,905	0	40.8	40	18	90	20.9	257
NON-MOTOR-VEHICLE ACCIDENTS	34.3	153	5,249	0	59.0	59.5	90	102	26.2	258
INTENTIONAL SELF-HARM (SUICIDE)	34.1	162	5,530	13	45.1	42	24	95	19.4	179
HIV INFECTION	32.2	5	161	27	42.8	40	-	63	13.2	5
CHRONIC LIVER DISEASE AND CIRRHOSIS	21.1	92	1,940	28	58.7	57	67	90	14.6	111
SEPTICEMIA	19.5	30	585	0	75.0	80	74	99	18.2	87
NEPHRITIS, NEPHROTIC SYNDROME, AND NEPHROSIS	16.7	30	500	0	78.0	82	90	102	18.1	101
PNEUMONIA & INFLUENZA	15.8	44	697	0	82.9	86	88	106	14.4	257
DIABETES	15.7	119	1,868	1	73.1	76	78	104	16.0	263
HEART DISEASE	13.3	698	9,258	0	77.2	80	86	106	13.9	1,974
CANCER	13.1	925	12,098	3	72.3	74	81	104	13.5	1,838
CEREBROVASCULAR DISEASE	11.7	113	1,325	27	81.4	84	85	102	11.4	571
CHRONIC LOWER RESPIRATORY DISEASES	8.5	221	1,875	34	76.8	78	80	101	10.1	587
ATHEROSCLEROSIS	7.6	8	61	59	84.9	87	85	100	9.6	49
ALZHEIMER'S	4.7	20	94	58	85.8	86	93	103	7.5	236
OTHER CAUSES	22.7	595	13,484	0	74.0	80	85	107	21.3	1,612

* The *mean* is the arithmetic average, the *median* is the midpoint, and the *mode* is the age for the greatest number of decedents. The *standard deviation* measures the concentration of the distribution around the mean.

The category “conditions originating in the perinatal period” showed the greatest average loss to an individual (75 years lost). Traumatic causes of death--including motor vehicle accidents (38 years), other accidents (34.3), homicide (44.4), and suicide (34.1)—occupied four of the next five highest ranks

Figure 53 summarizes average and total YPLL-75, frequency of death, and age at death in tabular form for these same 17 causes of death. The left side of the table shows YPLL-75 and related measures--i.e., measures referring to the number of decedents in 2003 who died before the age of 75. The right side of the table shows statistics referring to all decedents, regardless of age. Causes of death are shown in descending order of average years of life lost before age 75.

In general, average YPLL-75 was high when median age was low. For instance, Alzheimer's had the lowest associated average YPLL-75, 4.7 years per decedent younger than 75, and the highest associated median age, 86 years. There were several exceptions, however, because average YPLL-75 is influenced by both the age at which decedents died and the number of decedents under age 75 in the cause-of-death category in question. Average YPLL-75 was highest for those dying of conditions arising in the perinatal period. This is not surprising, since such decedents generally die in infancy or early childhood. Compared to the numbers who died of cancer or heart disease, relatively few residents died of conditions arising in the perinatal period, but all of these decedents who died with in the first year of life (22) contributed the maximum number of years (75) to total YPLL-75.

Although YPLL has significant advantages for analyzing mortality data from a public health perspective, it has a decided disadvantage in that some data—the records of the older decedents—are excluded from the calculations. More than half of the decedents who died from septicemia, pneumonia and influenza, nephritis, heart disease, diabetes, cerebrovascular disease, chronic lower respiratory disease, atherosclerosis, and Alzheimer's are excluded from YPLL-75 analysis. While YPLL highlights those causes of death having the greatest impact on the younger members of the population, it does so at the cost of diverting attention from the causes of death affecting older members.